

For Reference

NOT TO BE TAKEN FROM THIS ROOM

For Reference

NOT TO BE TAKEN FROM THIS ROOM

Ex LIBRIS
UNIVERSITATIS
ALBERTAENSIS





Digitized by the Internet Archive
in 2019 with funding from
University of Alberta Libraries

<https://archive.org/details/Ayers1965>

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

RESEARCH REPORT

1955

1956

1957

1958

1959

1960

1961

74-25-3
1-2-61
3

THE UNIVERSITY OF ALBERTA

AROUSAL AND COMMUNICATION AS
FUNCTIONS OF ROLE CONFLICT

by

David Walter Ayers

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS
DEPARTMENT OF PSYCHOLOGY
EDMONTON, ALBERTA

UNIVERSITY OF ALBERTA
FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Arousal and Communication as Functions of Role Conflict", submitted by David Walter Ayers in partial fulfilment of the requirements for the degree of Master of Arts.

Abstract

The purpose of this study was to determine the effects of role conflict on arousal and social behavior. Three levels of role conflict were induced in a group discussion situation in which the subjects were group leaders and the followers were confederates of E. The 2 x 2 x 3 experimental design counterbalanced sex, Ss' self-expectations regarding leadership behavior, and followers' expectations of S. Heart rate and GSR were employed as measures of arousal while length and latency of communication were employed as measures of social behavior.

Although no effects of role conflict on arousal or social behavior were demonstrated, the leader's arousal was found to vary directly with follower consensus regarding group norms. It was suggested that arousal, S's involvement in the role, and group consensus merit further consideration as variables in a role conflict situation.

Acknowledgements

I would like to express special appreciation to Dr. B. G. Rule for many helpful suggestions during the course of this research. I would also like to extend thanks to those students, too numerous to mention, who volunteered their time to serve as confederates in this study. Finally, the encouragement given this project by Dr. W. A. Blanchard and Dr. W. A. S. Smith was very much appreciated.

David Walter Ayers

To Paula

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF APPENDICES	ix
INTRODUCTION	1
The Problem	7
METHOD	
Design	11
Subjects	12
Confederates	14
Apparatus and Materials	14
Procedure	15
RESULTS	
Behavioral Measures	19
Physiological Measures	22
DISCUSSION	28
SUGGESTIONS FOR FUTURE RESEARCH	33
SUMMARY AND CONCLUSIONS	36
REFERENCES	38
APPENDIX A	41
APPENDIX B	42

	Page
APPENDIX C	46
APPENDIX D	47
APPENDIX E	48

LIST OF TABLES

	Page
TABLE 1	
Summary of Experimental Design	13
TABLE 2	
Summary of Analysis of Variance of Proportion of Fifteen Minutes Leader Spent Talking	21
TABLE 3	
Summary of Analysis of Variance of Leader's GSR	24
TABLE 4	
Summary of Analysis of Variance of Leader's Heart Rate	26

LIST OF APPENDICES

	Page
APPENDIX A	
Questionnaire for the Selection of Directive and Non-directive Leaders	41
APPENDIX B	
Stimulus Cards	42
APPENDIX C	
Means and Standard Deviations of Length of Communication Data	46
APPENDIX D	
Means and Standard Deviations of GSR Data	47
APPENDIX E	
Means and Standard Deviations of Heart Rate Data	48

Introduction

The concept of role, originally a theatrical term, was introduced into scientific parlance by nineteenth century sociologists. Since its scientific inception, the concept has occupied a position of considerable importance in sociological theorizing; it has filled the theoretical hiatus between conceptions of the individual and conceptions of the social institution. According to Martindale (1960), exponents of major sociological theories (Parsons, 1951; Mead, 1934; Znaniecki, 1940; Gerth and Mills, 1953; Merton, 1957) are in essential agreement regarding the place of role in sociological theory. These authors hypothesize that social structure is composed of institutions which are in turn composed of roles, while roles are composed of mutual expectations.

Sociological definitions of role have been many and varied; however, the inclusion of mutual expectations as a definitional component is nearly universal. A mutual expectation is an expectation held by both the actor of the role and the person(s) in respect to whom the role is being acted. The expectation itself is considered to be a voiced or unvoiced group consensus regarding the desirability or undesirability of a specific kind of behavior of the role actor. Group consensus regarding any given expectation may be less than unanimous. As unanimity decreases, the salience of the expectation is said to decrease. In summary, a minimal sociological definition would state that role is a set of mutual expectations regarding a corresponding set of the role

actor's behaviors.

The concept of role presently assumes far less importance in psychology than it does in sociology. In social psychology, role is employed primarily as a term descriptive of the changes that occur in an individual's behavior when he is placed in different social settings. The concept is generally viewed as a phenomenon rather than a variable of theoretical or empirical interest. Psychological writings commonly adopt a sociological definition of role or define role loosely by way of concrete examples. This thesis adopted the sociological definition of role, defining it as a set of mutual expectations regarding a corresponding set of the role actor's behaviors.

Studies in the research literature have usually employed the concept of expectations as the defining characteristic of role. Some studies define role as a set of mutual expectations, but the major portion of the research neglects the role actor's own expectations and places major emphasis on the other persons' expectations regarding the role actor's behavior. Empirical research on role is quite sparse when compared with research on other topics. Neiman and Hughes (1951), in a review of role literature to 1950, found that before 1940 there was no research on role, despite the fact that the concept had been referred to in the literature since the turn of the century. The authors discovered that role was used in experimentation during the period 1940-1950, but that it was not used in predictive studies, nor was it used in the formation of

hypotheses. This state of affairs prompted Neiman and Hughes to suggest that the concept of role is empirically sterile and theoretically ad hoc, and that one might profitably turn one's scientific curiosity toward more fruitful concepts. Since 1950, the complexion of the research situation has not changed materially. There have probably been fewer than twenty-five empirical studies conducted since 1950 that deal with any aspect of role. Few results of these studies have been further explored in later studies, and there are no major conceptual threads running through the research that allow one to relate studies on role to other bodies of research. With few exceptions, studies in this area have employed subjective report data as the only dependent measures. Experimental manipulation of the independent variables was usually accomplished by presenting S with a situation on paper and having S imagine that he is in the situation described.

Research on role has been quite diverse. Two studies have investigated the effects of the assignment of roles to Ss. Steiner and Dodge (1956) discovered that accurate interpersonal perceptions facilitated individual and group productivity when group members had not been assigned roles. Interpersonal perception bore little relation to productivity when roles were assigned. Steiner and Field (1960) demonstrated that the assignment of roles in group discussion makes it difficult for S to judge the real attitudes of other Ss in the group. This difficulty is reflected in communication, attitude change, sociometric choice, and interpersonal per-

ception. The relationship between excessive role variability and maladjustment was investigated by Block (1961), who discovered a positive correlation between excessive role variability and the CPI measure of susceptibility to anxiety. Sarbin and Jones (1955) have constructed a psychological test of role taking aptitude, which correlates positively with validity of role enactment and social adjustment, and negatively with self-constancy following role enactment. Rodgers (1957) found that role insight, role taking ability, and flexibility of self-perception each correlate highly with role success. Jones and deCharms (1958) demonstrated that when S was assigned three different roles toward a stimulus person, S's rating of that person varied significantly with the role assigned. Brown (1952) has demonstrated that a role is more accurately enacted when it assumes the same sex as the actor assigned the role. Brown also demonstrated that situational variables have a greater effect on role playing behavior than do the personality variables assessed. There are no empirical generalizations that the author wishes to draw from this body of research.

The definition of role as a set of mutual expectations makes possible a number of definitions of role conflict. One could assert that role conflict exists for the role actor, (1) when one or more of the actor's self-expectations are incompatible with corresponding expectations placed on him by others in the situation, (2) when others in the situation hold incompatible expectations of the actor, (3) when the actor must simultaneously satisfy two or more

incompatible sets of mutual expectations, or (4) when there exists some combination of the above three possibilities. Most authors dealing with role conflict have defined it in terms of one or more of the above alternatives. Empirical studies of role conflict have usually employed the second or third of the above definitions; this thesis has employed the first. For purposes of this thesis, role conflict was said to exist when one or more of the role actor's self-expectations are incompatible with corresponding expectations placed on him by others in the situation. The severity of role conflict was said to vary directly with the number of other people in the situation who hold expectations of the actor that are incompatible with the actor's self-expectations.

Different aspects of role conflict have been recently investigated. Two studies by Getzels and Guba (1954, 1956) have demonstrated that liability to role conflict is associated with a number of personality characteristics assessed by the GAMIN, STDCR, California E and F, and Rosenweig P-F tests. Ehrlich (1959) determined that competing legitimate or obligatory expectations were associated with greater ambivalence than were other patterns of legitimate and obligatory expectations. This finding was not confirmed in a later study by Ehrlich, Rinehart, and Howell (1962), who demonstrated that S's perception of others' expectations was as predictive of S's behavior as the legitimacy, sanctions, and obligation associated with the expectations. Stouffer (1949) classified Ss with respect to the degree to which Ss perceived overlap

between conflicting expectations. In a later study with Toby (1951), a Guttman scale was developed which yielded scale types ranging from particularistic to universalistic in mode of response to role conflict. Items from the Stouffer and Toby scale were combined with items from other tests by Sutcliffe and Haberman (1956). A centroid factor analysis was performed on all items, with the expectation that universalism-particularism would emerge as a factor. After orthogonal rotations to simple structure, three factors were identified as authoritarianism-submission, sex role conservatism, and morality-immorality. Gullahorn (1956) assessed the degree to which S experiences role conflict by the development of a questionnaire. Morgan (1962) discovered that role conflict was not dealt with by minimizing perceived differences between conflicting roles. Videbeck and Bates (1959) found that the frequency of occurrence of various behaviors varied directly with group consensus regarding the desirability of the behaviors in question. This effect was demonstrated for groups as a whole and for specific group members.

Although some effects of role conflict on behavior have been demonstrated, as well as some effects of other variables on experienced role conflict, all of the above results must be viewed with some reservation. One fails to find a single replication, and most studies have exclusively employed paper and pencil techniques with all the attendant artifactual effects of these techniques. No empirical results in the role conflict literature

have direct relevance to the purposes and hypotheses of this study. However, conceptualizations employed by Stouffer (1949) and Getzels and Guba (1954) were utilized in the formation of hypotheses in the present study.

The Problem

Stouffer (1949) has suggested that an individual may respond to role conflict by (1) abandoning all sets of role expectations except one, or (2) seeking a compromise set of behaviors which satisfies all sets of expectations somewhat but no set of expectations completely. Getzels and Guba (1954) repeat these alternatives and add, (3) withdrawing physically or psychologically from the roles altogether. One aim of this thesis was to demonstrate the occurrence of these modes of role conflict resolution.

If the assumption is made that behavioral acts which are in accord with mutual expectations have a higher probability of occurrence than other behavioral acts, it may be seen that each of the hypothesized modes of role conflict resolution involve a restriction of behavior. That is, each mode of resolution is a schema for performing less than the total number of behaviors called for by the expectations of others. Since, by definition, the total number of mutual expectations decreases as role conflict increases, the assumption regarding higher probability of behaviors in accord with mutual expectations also leads to the expectation that increasing role conflict will produce increased restriction

of behavior. These considerations prompted the following predictions:

- (1) Role conflict produces restriction of social behavior.
- (2) As role conflict increases, social behavior will be increasingly restricted.

The social behavior of interest in this thesis was verbal communication, chosen primarily because of ease of measurement. It was hypothesized that differences in restriction of verbal communication are evidenced by differences in length and latency of the communication. Increasing role conflict was predicted to produce communications of shorter length and greater latency.

A second purpose of this thesis was to test the assumption that role conflict is motivating. This assumption is implicitly made when one postulates the necessity of resolving role conflict. The demonstration that role conflict is motivating is in one sense superfluous; it is intuitively obvious that this is the case. What is important, however, is that the extent of this motivation be determined with respect to differing degrees of role conflict. A demonstration of the motivational aspects of role conflict would also be of value in providing a bridge between role conflict research and other bodies of research. Such a bridge between research areas may be exemplified by the recent (Berkowitz, 1960) employment of the concept of assimilation-contrast to effect a rapprochement between psychophysical judgment and social judgment. A similar rapprochement between role conflict research and another

THE UNIVERSITY OF CHICAGO PRESS

CHICAGO, ILL.

1

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS

body of research might be accomplished if the motivational construct employed in role conflict research is in standard usage in other areas. The motivational construct employed in this thesis was arousal. The foregoing considerations resulted in the following predictions:

(3) Role conflict is arousing

(4) As role conflict increases, arousal increases.

Arousal is commonly considered to be the nonspecific activation of the organism that results from the activity of the ARAS and other nonspecific systems. The concept of arousal includes, according to Duffy (1962), components of intensity and direction. This thesis was concerned with the intensity dimension. Duffy reports that the physiological variables of EMG, GSR, EEG, metabolic rate, respiration, heart rate, blood pressure, body temperature, and vasoconstriction are typically associated with arousal.

Heart rate and GSR were the two indices of arousal employed in this thesis. Berlyne (1960) has ably defended the GSR as an index of arousal; the status of heart rate is less well defined in this regard. After an extensive literature review to 1960, Duffy (1962) reports:

Heart rate and blood pressure are also responsive to changes in the demands of the stimulus situation, a more rapid heart rate and a rise in blood pressure tending to follow increases in the intensity or the significance of stimulation. But the relationship of these measures to the general level of activation of the individual is complicated by the fact that an increase in heart rate and a rise in blood pressure tend to some extent to inhibit each other.... There are, nevertheless, a number of studies which show an

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

increase in heart rate, or a rise in blood pressure, or both, when the individual becomes more highly activated.

Heart rate and GSR were both chosen as physiological measures of arousal because much research has been conducted with each, each responds rapidly, and the polygraph record of each is reasonably unambiguous. In addition to these advantages, heart rate (Hokanson and Burgess, 1964) and GSR (Berlyne et al., 1963) have both been related to voluntary behavior.

Method

The effect of role conflict on communication and arousal was assessed in a group discussion situation. S was instructed to lead two followers, both of whom were confederates of E, in a group discussion. S's self-expectations regarding leadership behavior were known in advance of the session. The expectations the followers held of S were manipulated such that, in three separate experimental conditions, both followers, one of the followers, or neither of the followers agreed with S's self-expectations.

The Design

Two levels of sex, two levels of leadership self-expectations, and three levels of followers' expectations were combined in a 2 x 2 x 3 factorial analysis of variance with three replications. Leaders (Ss) expressed a preference for being either directive or non-directive in their leadership. Followers (1) both expressed the preference that the leader be directive, (2) both expressed the preference that the leader be non-directive, or (3) one expressed a non-directive preference while the other expressed a directive preference. Whether or not the follower expectations produced role conflict depended on the self-expectations of the leader. Thus, all hypothesized effects of role conflict depended on leader expectations by follower expectations interactions. Sex was counterbalanced in all conditions. An additional level of the

leadership expectations factor was originally planned for this study, but difficulties in obtaining Ss for this condition necessitated its elimination. The eliminated condition was intended to test the occurrence of the compromise mode of role conflict resolution. With the elimination of this condition, no test of the compromise mode was possible. The experimental design is summarized in Table 1.

Subjects

Ss were eighteen male and eighteen female students enrolled in the introductory psychology course at the University of Alberta. One to two months prior to the experiment, a questionnaire was administered to all students in this course. Appendix A contains a sample of this questionnaire. The questionnaire presented two short paragraphs defining directive and non-directive group leadership. Following this, the student was required to state his preference for being either a directive or a non-directive group leader. On the basis of their response to the questionnaire, eighteen directive and eighteen non-directive leaders were chosen, with sex counterbalanced. Eight of the thirty-six Ss volunteered for the experiment to complete a course requirement of participation in four experiments. The remaining twenty-eight Ss had already completed their participation requirement, but volunteered when contacted by telephone.

Table 1.
Summary of experimental design.

Sex	Leader	Followers	Predicted role conflict resolution
M	D	DD	No conflict
		DN	Abandon N follower expectations
		NN	Withdraw
	N	DD	Withdraw
		DN	Abandon D follower expectations
		NN	No conflict
F	D	DD	No conflict
		DN	Abandon N follower expectations
		NN	Withdraw
	N	DD	Withdraw
		DN	Abandon D follower expectations
		NN	No conflict

Note.--Male is designated by M, female by F, directive by D, and non-directive by N.

THE ANNUAL REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE FOR THE YEAR 1884

STATE	ACRES	AMOUNT	REMARKS
Alabama	1,234,567	\$1,234,567	
Arkansas	987,654	\$987,654	
California	5,678,901	\$5,678,901	
Colorado	3,456,789	\$3,456,789	
Connecticut	123,456	\$123,456	
Delaware	67,890	\$67,890	
Florida	2,345,678	\$2,345,678	
Georgia	1,567,890	\$1,567,890	
Idaho	789,012	\$789,012	
Illinois	4,567,890	\$4,567,890	
Indiana	2,123,456	\$2,123,456	
Iowa	3,234,567	\$3,234,567	
Kansas	1,890,123	\$1,890,123	
Kentucky	1,012,345	\$1,012,345	
Louisiana	1,345,678	\$1,345,678	
Maine	56,789	\$56,789	
Maryland	89,012	\$89,012	
Massachusetts	101,234	\$101,234	
Michigan	2,567,890	\$2,567,890	
Minnesota	3,678,901	\$3,678,901	
Mississippi	1,123,456	\$1,123,456	
Missouri	2,789,012	\$2,789,012	
Montana	1,456,789	\$1,456,789	
Nebraska	2,012,345	\$2,012,345	
Nevada	678,901	\$678,901	
New Hampshire	45,678	\$45,678	
New Jersey	78,901	\$78,901	
New Mexico	1,567,890	\$1,567,890	
New York	4,123,456	\$4,123,456	
North Carolina	1,678,901	\$1,678,901	
North Dakota	1,234,567	\$1,234,567	
Ohio	3,012,345	\$3,012,345	
Oklahoma	1,890,123	\$1,890,123	
Oregon	1,012,345	\$1,012,345	
Pennsylvania	2,345,678	\$2,345,678	
Rhode Island	34,567	\$34,567	
South Carolina	1,123,456	\$1,123,456	
South Dakota	1,567,890	\$1,567,890	
Tennessee	1,456,789	\$1,456,789	
Texas	3,456,789	\$3,456,789	
Vermont	23,456	\$23,456	
Virginia	1,234,567	\$1,234,567	
Washington	1,012,345	\$1,012,345	
West Virginia	678,901	\$678,901	
Wisconsin	2,123,456	\$2,123,456	
Wyoming	1,567,890	\$1,567,890	

PREPARED BY THE COMMISSIONER OF THE GENERAL LAND OFFICE
 WASHINGTON, D. C., JANUARY 1, 1885

Confederates

Follower-confederates were volunteers from upper division psychology courses and selected volunteers from the author's introductory psychology tutorial. All confederates were urged to maintain the utmost secrecy with respect to their duties. Follower-confederates were both female with female leaders and both male with male leaders.

Apparatus and Materials

The experimental room was adjacent to a second room which housed a Beckman-Offner Type R dynograph; a one-way mirror was interposed between the two rooms. Ss' physiological responses were recorded on the dynograph, which was equipped with GSR and cardiometer couplers. Two straight-through couplers were used to convert the instrument pens to marker pens on two channels. The dynograph itself was equipped with a marker pen, yielding a total of three marker pens which were controlled by pressing a separate button for each.

The experimental room contained a table, three chairs, electrode leads, and a set of stimulus cards. One wall of the experimental room was insulated against sixty cycle interference. Six electrode leads were permanently taped to the table at the position of each of the three chairs around the table. There were thus three electrode leads for each arm of each group member. Only the six electrodes attached at the leader's position were functioning.

The stimulus cards, which are shown in Appendix B, were eight and one half inches by eleven inches and were mounted upright on the end of the table such that all group members, when seated, could see them easily. Each card contained a solid black figure on a white background. The figures portrayed were a boxer, a student at his desk, and children on a merry-go-round. A paper megaphone in the experimental room was connected to a stethoscope earpiece in the dynograph room by means of a length of rubber tubing. This enabled E to listen to conversation in the experimental room while operating the dynograph. The paper megaphone became necessary when it was discovered that an intercom created sixty cycle interference on the dynograph record.

Procedure

Prior to the experiment, E and any participants present interacted casually in the dynograph room for approximately five minutes. This allowed other participants time to appear for the session. All participants were then moved to the experimental room, where they were seated at the table. Electrodes were then attached to both arms of each follower between the elbow and the wrist. Electrodes were similarly attached to both forearms of the leader, and to the index and third fingers of the leader's left hand. S's adaptation period to the electrode placement was approximately eight minutes. During this time, the participants were given the experimental instructions. There are no criteria in the literature for determining the completion of adaptation. No attempt was made

in the present study to determine whether or not S's heart rate and GSR had reached a steady baseline. Time limitations made it impossible to employ the thirty minute period utilized by Berlyne et al (1963) for adaptation.

The participants were informed that there would be no electric shocks in the experiment, and that the electrodes were being used to detect simple physiological responses. They were told that E must be absent from the room during the session in order to operate the physiological recording equipment, but that E would be able to see them through a one-way glass and hear their conversation. The participants were then instructed in a task similar to that used by McClintock (1963) in which TAT cards were used as a basis for group discussion. Participants were instructed as follows:

The department of psychology is constructing a psychological test for use with small groups and group leaders. The test is in its final stages of construction; consequently, what you will do today is quite important. First, I would like you to select one of the three cards you see here as the card you unanimously feel is most conducive to group discussion. After you have selected the card, I would like you to make up a story about the card, upon which you can all agree. Are there any questions?

The group was then read the two paragraphs from the questionnaire which defined directive and non-directive leadership. The group was informed of the leader's preference for being directive or non-directive, as his questionnaire response had indicated. Follower-confederates were then each asked whether they would prefer a directive or a non-directive leader. Follower-confed-

erates then indicated the preferences that they had been instructed by E to indicate. In this way, the degree of follower disagreement with the leader's preference was randomly assigned to leaders within each of the directive and non-directive leadership conditions. Follower-confederates were instructed in all cases to attempt to make their comments last for at least five seconds, to keep humor to a minimum, but otherwise to respond naturally. Confederates were instructed not to try to stress the leader over and above the experimentally designated expression of preference at the beginning of the session. In particular, confederates were instructed to express hostility or disagreement only if these were natural reactions. The group was given fifteen minutes in which to complete the two tasks.

It was thought initially that Ss would reliably indicate to their followers the preference for directive or non-directive leadership that had been expressed on the questionnaires. Occasionally, however, Ss expressing a directive preference on the questionnaire expressed a non-directive preference to the group. After twenty-two groups had been run, it was decided to switch to the experimental procedure outlined above of publicly reminding the leader of his previously expressed preference. This procedure insured a sufficient number of Ss for both leadership conditions. Data collected before the change in procedure were retained and combined with the data from the fourteen groups run after the procedural change. Designation of experimental conditions in the

twenty-two groups run prior to the procedural change was based on Ss' preferences expressed in the experimental session, rather than on Ss' preferences expressed on the questionnaire. One S recognized a confederate as an E from a different experiment. The data for this S were discarded, and a replacement S was run.

Results

The dependent variables in this thesis were social behavior and arousal. Length and latency of the verbal communication of the leader were the measures of social behavior; leader's heart rate and GSR were the measures of arousal.

Behavioral Measures and Analysis of Variance

The conversation of each group member was recorded on the dynograph record by the deflection of a marker pen for each group member, as long as the group member was speaking. The latency of S's comments was defined as the average length of time intervening between the termination of a follower's comment and the beginning of S's comment. Latencies were approximately 0.5 seconds. Occasionally it was difficult for E to determine who was speaking, and on such occasions deflection of the corresponding marker pen was delayed as much as 1.0 seconds. Because of this difficulty, it was decided that the latency data were not sufficiently reliable to warrant statistical treatment. Latency data will not be considered further in this thesis, and all references to communication in discussions to follow will refer to length rather than latency of communication.

Within each of the experimental groups, proportions of the total fifteen minutes during which the leader was talking, each follower was talking, and during which there was silence were computed. If a break in the speaker's discourse lasted less than

1.5 seconds, and if another speaker did not intervene with a comment during this break, the break was disregarded and the speaker's comment was tabulated as continuous. The delay in pen deflection which necessitated the discarding of the latency data also had the effect of reducing the reliability of the length of communication data. In the case of length of communication, however, the effect was considerably smaller.

Table 2 presents the results of an analysis of variance of the proportion of fifteen minutes that the leader spent talking. Means and standard deviations for all cells in this analysis are presented in Appendix C. It was hypothesized that the proportion would decrease as role conflict increased. Since role conflict was defined as a relationship between leader's self-expectations and followers' expectations of the leader, any demonstration of the effects of role conflict depended on an interaction that included the factors of leader and follower preference. Orthogonal comparisons were originally planned to partition such an interaction into components corresponding to the predicted modes of role conflict resolution. Such an interaction was not obtained; thus, the orthogonal comparisons were not employed, and none of the results to be reported were predicted.

Non-directive leaders spent an average of .33 of the fifteen minutes talking, while directive leaders spent an average of .41 of the fifteen minutes talking. This difference was significant ($F = 5.49$, d.f. = 1, 24, $p < .05$). Leaders of followers with NN

Table 2.

Summary of analysis of variance of
proportion of fifteen minutes leader spent talking.

Source of variation	Sum of squares	d.f.	Mean square	F
Leader self- expectation	461.53	1	461.53	5.49 *
Combined followers' expectation	637.93	2	318.97	3.79 *
Sex	17.78	1	17.78	
Leader x Followers	44.06	2	22.03	
Leader x Sex	178.22	1	178.22	2.12
Followers x Sex	148.25	2	74.13	
Leader x Followers x Sex	46.00	2	23.00	
Within	2018.35	24	84.10	

* $p < .05$

preference spent an average of .33 of the fifteen minutes talking; leaders of ND followers spent .36 of the fifteen minutes; leaders of DD followers spent .43 of the fifteen minutes. Leaders of NN followers spent significantly less time talking than leaders of DD followers; no other differences were significant (Duncan's Multiple Range, $R_2 = .077$, $R_3 = .081$, $p < .05$).

Physiological Measures and Analysis of Variance

The leader's GSR was tabulated as the total number of GSR responses of the leader in fifteen minutes. A GSR response was defined as a pen deflection in the direction of lowered skin resistance which exceeded twenty-five percent of the total range of pen deflection observed in fifteen minutes. The twenty-five percent deflection had to occur within a 5.0 second time span before it was tabulated as a response. Berlyne et al (1963) has defined a GSR response as any pen deflection away from the baseline in the direction of lower skin resistance that occurs within four seconds of the onset of the stimulus and returns toward the baseline within ten seconds of the deflection. The adaptation period in this thesis was not sufficient to produce a steady baseline in most Ss, and a criterion for pen deflection other than that employed by Berlyne was necessary. Five dynograph records with the clearest GSR responses were examined by E, and it was found that the pen deflection for these GSR responses averaged approximately forty percent of the total observed pen deflection. It was also determined that rhythmic fluctuation in the baseline of these records averaged approximately

fifteen percent of the total observed range of pen deflection. The operational criterion of twenty-five percent pen deflection was then arbitrarily determined. This thesis employed no discrete stimuli as in the Berlyne study, and it was necessary to specify the maximum allowable time for a twenty-five percent pen deflection. Inspection of the dynograph records revealed that all clear GSR responses occurred within 3.0 seconds of the onset of the pen deflection. The operational time limit for a twenty-five percent deflection was then arbitrarily set at 5.0 seconds. When these criteria were employed, over half the Ss exhibited no GSR responses.

Table 3 presents the results of an analysis of variance of the total number of GSR responses exhibited by the leader in fifteen minutes. Means and standard deviations of all cells in this analysis are presented in Appendix D. There were no significant effects.

The leader's heart rate was determined for the times during which he was speaking, each follower was speaking, and during which there was silence. The leader's heart rate while he was speaking was determined by dividing the total number of heart beats, summed over all occasions of his speech, by the total time in fifteen minutes that he spent talking. Discourse of the leader that lasted less than 5.0 seconds was not included in the heart rate determination because of the variability in the number of heart beats that was exhibited during intervals less than 5.0 seconds. This procedure was similarly employed to determine the leader's heart rate during follower conversation and during silence.

Table 3.

Summary of analysis of variance of
total GSR responses of leader.

Source of variation	Sum of squares	d.f.	Mean square	F
Leader self- expectation	13.44	1	13.44	1.30
Combined followers' expectation	32.66	2	16.33	1.57
Sex	0.44	1	0.44	
Leader x Followers	6.25	2	3.13	
Leader x Sex	0.12	1	0.12	
Followers x Sex	4.24	2	2.12	
Leader x Followers x Sex	3.95	2	1.97	
Within	248.90	24	10.37	

The 5.0 criterion was reduced to 4.0 seconds for the determination of the leader's heart rate during silence for four experimental groups. In these groups there were no periods of silence that lasted 5.0 seconds or more. The criterion was lowered on these four occasions after it was decided that real, though less reliable, data were preferable to data entries that had been estimated by some standard estimation procedure. Of the one hundred-eight cell entries in the analysis of variance to follow, only four were affected by the change in standards. In addition to the above determination of heart rate, the leader's heart rate during pooled follower conversation was determined by dividing the total heart beats, summed over all occasions during which either follower was speaking, by the total time taken by both followers in conversation.

Table 4 presents the results of a split-plot repeated measures analysis of variance of leader's heart rate in which the $2 \times 2 \times 3$ factorial of sex, leader preference, and combined follower preference was assigned between groups and three levels of a communication factor, leader conversation, pooled follower conversation, and silence were assigned within groups. Means and standard deviations for all cells in this analysis are presented in Appendix E. It was hypothesized that the leader's heart rate would increase as role conflict increased. Demonstration of this effect was dependent on the presence of an interaction that included the factors of leader and follower expectations. Such an interaction was not

Table 4.

Summary of analysis of variance of leader's heart rate.

Source of variation	Sum of squares	d.f.	Mean square	F
Sex	22.05	1	22.05	
Leader	133.04	1	133.04	
Followers	2815.84	2	1407.92	4.54 *
Sex x Leader	310.59	1	310.59	
Sex x Followers	726.93	2	363.47	1.17
Leader x Followers	612.02	2	306.01	
Sex x Leader x Followers	465.55	2	232.78	
Error	7448.72	24	310.36	
Communication	553.06	2	276.53	23.36 **
Communication x Sex	10.46	2	5.23	
Communication x Leader	29.81	2	14.91	1.26
Communication x Followers	68.35	4	17.09	1.44
Communication x Sex x Leader	14.20	2	7.10	
Communication x Sex x Followers	20.12	4	5.03	
Communication x Leader x Followers	11.92	4	2.98	
Communication x Sex x Leader x Followers	8.15	4	2.04	
Error	568.11	48	11.84	

* $p < .025$ ** $p < .001$

obtained; thus, none of the results to be reported were predicted.

The average total heart rate for all leaders was 89.59 beats per minute. Summing over leader's self-expectations, leaders' average heart rate in groups with follower expectation DN = 82.83, in DD groups = 92.95, and in NN groups = 94.74. Leaders of DN groups had a significantly lower heart rate, on the average, than leaders of DD and NN groups. There was no significant difference between leaders of DD and NN groups (Duncan's Multiple Range, $R_2 = 8.58$, $R_3 = 9.01$, $p < .05$). The leader's average heart rate while he is talking = 92.69, during silence = 90.04, and while followers are talking = 87.15. All differences were significant (Duncan's Multiple Range, $R_2 = 2.41$, $R_3 = 2.50$, $p < .005$).

Discussion

The most salient finding of this study was that leaders of DN groups, regardless of their own self-expectations, exhibited significantly lower heart rates than leaders of DD or NN groups. One possible interpretation of this result is that follower confederates in the DN condition who were made to express a preference contrary to that of the leader might have been perceptibly apologetic and embarrassed in their behavior. This would have had the effect of diminishing the demands made upon the leader. It appeared that this condition, if it existed, would be reflected in less communication on the part of followers expressing expectations contrary to the leader within the DN condition. The average proportion of fifteen minutes for these followers was .24, whereas followers who were made to express a preference in support of the leader yielded a proportion of .31. This difference was significant ($t = 1.77$, d.f. = 22, $p < .05$, one tailed). If follower embarrassment was perceptible, the leader was under less pressure and showed less arousal. In DD and NN groups, expression of a preference opposite to the leader's would have been supported by another follower, resulting embarrassment reduced, and demands on the leader made stronger.

Another possible interpretation of this result involves a definition of role conflict that was not employed in this study. If role conflict is defined as a conflict in follower expectations, regardless of the leader's self-expectations, then the only leaders

CHAPTER II

THEORY OF THE

THEORY OF THE

THEORY OF THE

experiencing role conflict were leaders of DN groups. In this case, this thesis provides significant effects of role conflict. One would have to draw the uncomfortable conclusion that role conflict produces a decrease in arousal, since leaders of DN groups exhibited the significantly lowest heart rate. This interpretation could also be applied to the finding that leaders of DN groups communicated more than leaders of NN groups and less than leaders of DD groups. One could conclude in this case that leaders of DN groups resolved the role conflict by compromising between the D and N expectations.

A somewhat different interpretation may be placed on the finding that leaders of DN groups exhibited the lowest heart rate. This is done by noting that the DN condition may be conceptualized as a lack of consensus regarding the group norm. As mentioned previously, a decrease in unanimity regarding an expectation results in a decrease in the salience of that expectation. Thus, as unanimity decreases, the demands on the role actor become weaker, and as demands weaken, arousal decreases. The suggestion that arousal varies directly with group consensus regarding expectations is potentially the most theoretically significant result of the present research. It may be the case that the construct of arousal has relevance for any research dealing with the effects of group consensus.

It was originally expected that the modes of role conflict resolution, abandonment and withdrawal, would be manifested in

differences in communication and arousal. It was hypothesized that increasing role conflict would result in a reduction of communication and an increase in arousal. All of these predictions depended on leader expectations and follower expectations being components of the same interaction. A demonstration of this is not available from present findings. There are at least four possible reasons for the lack of such an interaction. First, and most obviously, role conflict may have no effect on arousal or communication.

Secondly, it is possible that the procedure for selecting Ss resulted in a biased sample. With the exception of eight Ss, all Ss responded to social pressure in a telephone conversation with E. Those students who did not respond positively were not used as Ss. It may be the case that Ss who respond to social pressure find it rather easy to disregard their own preferences vis-a-vis the preferences of others, and show a chameleonic conformity to group norms.

A third possibility, discussed earlier, is that S's self-expectations play no real part in the determination of his social behavior. This view is implicitly assumed by those authors who define role conflict as an incompatibility in others' expectations of the role actor. A position such as this reflects the view that the determinants of social behavior are primarily sociological rather than psychological.

A fourth possibility involves the concept of involvement.

It has been demonstrated in research on discrepant communication and attitude change that Ss change their own stand in the direction of a discrepant communication to a greater degree when they have no personal involvement in the issue (Freedman, 1964). When Ss are involved in an issue, presentation of a persuasive communication that differs greatly from S's stand usually results in little attitude change, and sometimes the change is in a direction opposite to the persuasive communication. Since Ss were not necessarily leaders in real life, the issue of directive versus non-directive leadership was quite probably one of little involvement for most Ss, and this resulted in a rather easy conformity to group norms and a lack of interaction between S's stand and the stand of the group. In the author's opinion, the most plausible explanation of the lack of leader by follower interactions is a combination of a biased sample and a lack of leader involvement.

It was observed that the leader's heart rate was highest while he was speaking, next highest during silence, and lowest when his followers were speaking. Since one function of a leader is to keep conversation moving, one may postulate that leaders felt responsible during silence. That the leader experienced higher arousal while he was speaking, for whatever reasons, is the obviously expected result.

The only significant effect of the leader expectations factor was on communication, with non-directive leaders communicating less than directive leaders. Non-directive was probably inter-

preted by Ss to mean participating less than directive, and this interpretation was reflected in a straightforward manner by the experimental result.

Leaders of DD groups communicated most; leaders of DN groups communicated next most, and leaders of NN groups communicated least. Under the assumption that non-directive was interpreted by Ss to mean participating less, this finding reflects compliance on the part of the leader to the combined expectations of his followers.

The change in experimental procedure from allowing the leader to state his preference for type of leadership behavior to publicly reminding the leader of his previously stated preference should have had little, if any, effect on the factors of sex and combined follower preference. These factors were randomly distributed before and after the change in procedure. Although more directive than non-directive leaders were run following the change in procedure, interpretation of the effects of this factor may already be considered tenuous because of a possible correlation of leadership preference with other variables.

In summary, the three modes of role conflict resolution, compromise, abandonment, and withdrawal, were not demonstrated by means of social behavior or arousal, as measured in this study.

Suggestions for Future Research

This thesis may be considered an exploratory study in the area of role conflict, since the preponderance of studies in this area have employed subjective report data as the only dependent measures. As an exploratory study, the thesis research was successful in that concrete and meaningful suggestions for future research may be derived from it. Following are suggestions for any research that employs a definition of role conflict similar to that employed in this thesis.

S's involvement in his role appears to be of major importance in the study of role conflict. In an attempt to increase S's involvement, future studies might (1) utilize established groups, or (2) employ roles in which S is involved. One might systematically vary involvement by selecting real leaders and non-leaders as Ss for a task similar to that employed in this thesis. It would be assumed that involvement would be greater for leaders than for non-leaders.

If, as was concluded in this study, lack of consensus weakens role demands, an attempt should be made to systematically vary group consensus regarding role expectations. It may be the case, however, that lack of consensus weakens demands only for non-involving roles; it is therefore suggested that involvement and consensus be systematically varied in the same study.

In the present study, arousal was found to vary directly with

group consensus. It is suggested that a measure of arousal be retained in studies of role conflict; it is also suggested that the construct be employed in research dealing with effects of group consensus. Future investigations of role conflict might also benefit by investigating the content of verbal communication. A schema such as Bales' (1950) categories of social interaction might be of some use in this regard.

The lack of GSR results in this thesis deserves some comment. It would appear initially that the operational definition of a GSR response is at fault because of the paucity of GSR responses observed under the criteria employed. It is the author's opinion, however, that the operational definition was adequate for the data, and that the real source of difficulty was in the inadequate length of the adaptation period. If time had permitted an adaptation period sufficient to yield a steady baseline, the percent total deflection criterion would have been unnecessary, and a GSR could have been defined in a manner similar to Berlyne et al (1963). It is therefore suggested that studies employing the GSR allow a sufficient time for adaptation to occur.

The definition of role conflict employed in this thesis was questioned when arousal was found to vary with group consensus, regardless of the leader's self-expectations. The data appear to support a conflicting expectations definition of role conflict that excludes the role actor's self-expectations. This definitional position is not advocated here, however, for two reasons. First,

the conclusion would have to be drawn from the present data that role conflict produces a decrease in arousal, and such a conclusion is intuitively unreasonable. Secondly, the most widely accepted definition of role includes a component of self-expectations, and it is reasonable that this component be included in definitions of role conflict as well. In this regard, some thought might be given to a definition of role conflict in terms of conflicting mutual expectations.

Summary and Conclusions

To determine the effects of role conflict on arousal and social behavior, directive and non-directive group leaders were instructed to lead two followers, both of whom were confederates of E, in a group discussion. Followers both expressed a directive, one a directive and one a non-directive, or both a non-directive preference for the leader's behavior. Three levels of role conflict were created.

No effects of role conflict on arousal or social behavior were demonstrated, and it was concluded that the primary factors responsible were a biased sample and a lack of S involvement in the leadership issue. Leaders of groups where consensus regarding the norms was lacking exhibited a lower heart rate than other leaders. This may best be interpreted as resulting from a reduction in the salience of the norms.

The leader's heart rate was highest while he was speaking, next highest during silence, and lowest during follower conversation. This result was attributed to the leader's feeling of responsibility for himself and the group. Non-directive leaders communicated less than directive leaders, but this finding was difficult to interpret, owing to the organismic status of the leadership variable. Leaders of two followers with directive preference communicated most, while leaders of two followers with non-directive preference communicated least. This was understood as reflecting compliance

with follower expectations.

It was concluded that group consensus, S involvement, arousal, and verbal content merit further investigation as variables in a role conflict situation.

References

- Bales, R. F. Interaction process analysis: a method for the study of small groups. Cambridge: Addison-Wesley, 1950.
- Berkowitz, L. The judgmental process in personality functioning. Psychol. Rev., 1960, 67, 130-142.
- Berlyne, D. E. Conflict, arousal, and curiosity. New York: McGraw-Hill, 1960.
- Berlyne, D. E., Craw, M. A., Salapatek, P. H., Lewis, J. L. Novelty, complexity, incongruity, extrinsic motivation, and the GSR. J. exp. Psychol., 1963, 66, 560-567.
- Block, J. Ego identity, role variability, and adjustment. J. consult. Psychol., 1961, 25, 392-397.
- Brown, J. C. An experiment in role taking. Amer. sociol. Rev., 1952, 17, 587-597.
- Duffy, E. Activation and behavior. New York: Wiley, 1962.
- Edwards, A. L. Experimental design in psychological research. New York: Holt, Rinehart, & Winston, 1960.
- Ehrlich, H. J. The analysis of role conflicts in a complex organization: the police. Unpublished doctoral dissertation, Michigan State University, 1959.
- Ehrlich, H. J., Rinehart, J. W., Howell, J. C. The study of role conflict: explorations in methodology. Sociometry, 1962, 25, 85-97.
- Freedman, J. L. Involvement, discrepancy, and change. J. abnorm. soc. Psychol., 1964, 69, 290-296.
- Gerth, H. & Mills, C. W. Character and social structure: the psychology of social institutions. New York: Harcourt & Brace, 1953.
- Getzels, J. W. & Guba, E. G. Role conflict and personality. J. Person., 1956, 24, 74-85.
- Getzels, J. W. & Guba, E. G. Role, role conflict, and effectiveness: an empirical study. Amer. sociol. Rev., 1954, 19, 164-175.
- Gullahorn, J. T. Measuring role conflict. Amer. J. Sociol., 1956, 61, 299-303.

- Hokanson, J. E. & Burgess, M. Effects of physiological arousal level, frustration, and task complexity on performance. J. abnorm. soc. Psychol., 1964, 68, 698-702.
- Jones, E. E. & deCharms, R. The organizing function of interaction roles in person perception. J. abnorm. soc. Psychol., 1958, 57, 155-164.
- Martindale, D. The nature and types of sociological theory. Boston: Houghton Mifflin Co., 1960.
- McClintock, C. G. Group support and the behavior of leaders and nonleaders. J. abnorm. soc. Psychol., 1963, 67, 105-113.
- Mead, G. H. Mind, self, and society. Chicago: University of Chicago Press, 1934.
- Merton, R. K. Social theory and social structure. Glencoe: The Free Press, 1957.
- Morgan, D. D. Perception of role conflicts and self concepts among career and noncareer college educated women. Unpublished doctoral dissertation, Columbia University, 1962.
- Neiman, L. J. & Hughes, J. W. The problem of the concept of role -- a re-survey of the literature. Soc. Forces, 1951, 30, 141-149.
- Parsons, T. The social system. Glencoe: The Free Press, 1951.
- Rodgers, D. A. Personality correlates of successful role behavior. J. soc. Psychol., 1957, 46, 111-117.
- Sarbin, T. R. & Jones, D. S. An experimental analysis of role behavior. J. abnorm. soc. Psychol., 1955, 51, 236-241.
- Steiner, I. D. & Dodge, J. S. Interpersonal perception and role structure as determinants of group and individual efficiency. Hum. Relat., 1956, 9, 467-480.
- Steiner, I. D. & Field, W. I. Role assignment and interpersonal influence. J. abnorm. soc. Psychol., 1960, 61, 239-245.
- Stouffer, S. A. An analysis of conflicting social norms. Amer. sociol. Rev., 1949, 14, 707-714.
- Stouffer, S. A. & Toby, J. Role conflict and personality. Amer. J. Sociol., 1951, 56, 395-406.
- Sutcliffe, J. P. & Haberman, M. Factors influencing choice in role conflict situations. Amer. sociol. Rev., 1956, 21, 695-703.

Videbeck, R. & Bates, A. P. An experimental study of conformity to role expectations. Sociometry, 1959, 22, 1-11.

Znaniecki, F. The social role of the man of knowledge. New York: Columbia University Press, 1940.

APPENDIX A

NAME (please print) _____

HOME PHONE _____ TUTORIAL NO. _____

TUTORIAL INSTRUCTOR _____

CIRCLE THE NUMBER OF EXPERIMENTAL CREDITS YOU HAVE RECEIVED TO DATE:

0 1 2 3 4

Please read the following descriptions of directive and non-directive group leaders, and answer the questions.

A DIRECTIVE group leader is one who molds group opinion by expressing his own ideas. He guides the group toward the goal he has selected, and he takes major responsibility for the group's decisions and actions. He is a strong leader.

A NON-DIRECTIVE group leader is just as active as a directive one, but he leads by eliciting comments from group members. He synthesizes group opinion, and he considers his own opinion as no more significant than that of another group member. He takes less responsibility for the group's decisions and actions. He is a weak leader.

1. If I were the leader in a group, I would be:

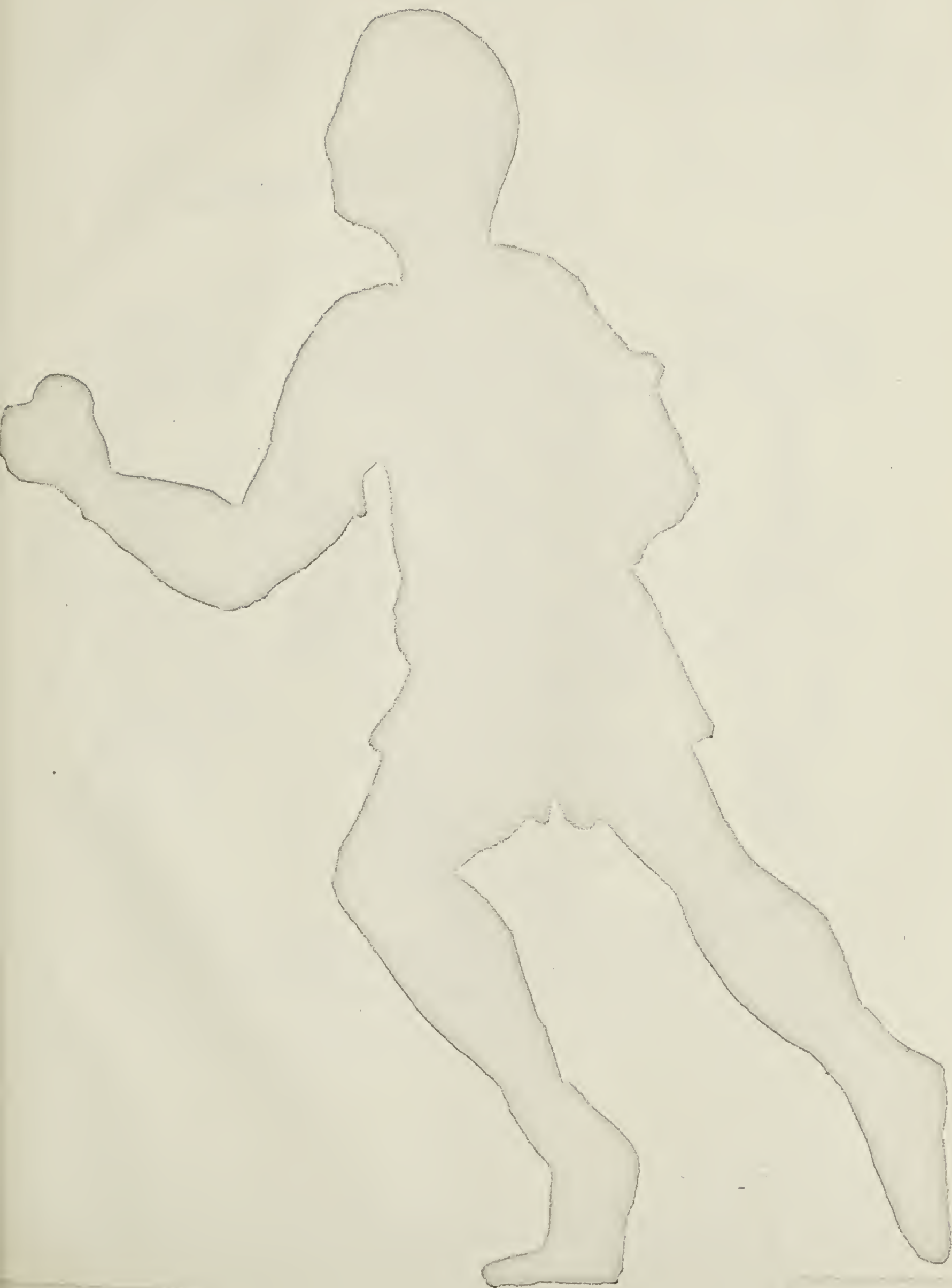
- a) Directive ____
- b) Neutral ____
- c) Non-directive ____

2. If I were a follower in a group, I would like the leader to be:

- a) Directive ____
- b) Neutral ____
- c) Non-directive ____

APPENDIX B

Stimulus Cards







APPENDIX C

Means and standard deviations of proportion of fifteen
minutes that leader spent talking data based
on three observations per cell.

	Male				Female			
	Directive leader		Non-directive leader		Directive leader		Non-directive leader	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
Followers								
DD	.463	.043	.423	.083	.453	.113	.368	.054
DN	.340	.069	.395	.032	.425	.107	.299	.063
NN	.326	.130	.260	.061	.428	.136	.290	.123

APPENDIX D

Means and standard deviations of GSR data

based on three observations per cell.

	Male				Female			
	Directive leader		Non-directive leader		Directive leader		Non-directive leader	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
Followers								
DD	0.00	0.00	3.00	4.36	1.66	2.88	3.33	3.65
DN	3.00	2.83	3.00	3.00	2.33	2.12	4.33	7.51
NN	2.00	0.00	1.33	2.31	0.33	0.57	0.66	0.57

APPENDIX E

Means and standard deviations of heart rate data
based on three observations per cell.

			Leader speaking		Follower speaking		Silence	
			\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
Sex	Leader	Followers						
M	D	DD	93.01	12.96	88.01	13.54	93.86	13.09
		DN	82.26	11.81	82.27	10.13	80.76	13.28
		NN	92.84	10.69	87.56	9.14	92.75	14.67
	N	DD	98.21	11.97	93.04	12.10	94.78	18.08
		DN	76.90	15.46	68.95	12.62	74.47	16.13
		NN	103.79	5.00	99.97	5.96	100.76	9.00
F	D	DD	96.38	7.37	89.37	7.77	92.63	8.97
		DN	92.54	2.91	86.58	5.38	92.45	8.51
		NN	97.89	3.16	94.48	7.38	96.66	3.71
	N	DD	92.16	6.44	87.19	5.22	88.42	8.33
		DN	85.92	5.86	82.31	4.79	82.20	5.52
		NN	93.42	17.27	86.09	12.14	90.75	15.03

B29833